AMENDMENTS TO THE DRAWINGS

Replacement formal drawings of Figures 2A-2C are enclosed. A second copy of the replacement drawings is also attached, in which the revisions effected are indicated in red ink.

REMARKS

A total of 10 claims are pending in the present application. The foregoing amendments are presented in response to the Office Action mailed April 2, 2004, wherefore reconsideration of this application is requested.

By way of the above-noted amendments, claims 1-3 have been amended to more clearly define features of the present invention, and to ensure consistency with the specification. New claims 9-15 have been introduced to define further features of the present invention, which are believed to be patentable. New claims 9 and 10 are method claims that depend, directly or indirectly from claim 1. New claims 11-15 are apparatus claims defining features of the system illustrated in FIGs. 3 and 4, which implements the method of claims 1-10. The specification has been amended to correct the domestic priority claim on page 1, and to correct minor typographical errors identified in the text. Figures 2A-2C have been labelled as "Prior art" as required by the Examiner.

In preparing the above-noted amendments, careful attention was paid to ensure that no new subject matter has been introduced.

Referring now to the text of the Office Action:

- The Examiner has objected to Applicant's claim to domestic priority, and has noted that a Certified copy of the priority PCT application has not been received by the Office;
- figures 2A-2C stand objected to;
- claims 1-2 stand rejected under 35 U.S.C. § 102(e), as being unpatentable over the teaching of United States Patent Application No. 2003/0228081 (Tavlykaev); and
- claims 3-8 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over the teaching of United States Patent Application No. 2003/0228081 (Tavlykaev) in view of United States Patent No. 6,693,929 (Essiambre et al.).

Each of the above issues is discussed below.

Priority Claims

Page 1 of the specification has been amended to correctly define the Applicant's claim to domestic priority. In particular, the present application is a Continuation in Part of Applicant's co-pending United States Patent Applications Nos. 10/307,466 filed December 2, 2002; and 10/405,236 filed April 3, 2003.

The required Certified Copy of the priority PCT Application No. PCT/CA03/01044 is enclosed with this response. Confirmation of receipt of the Certified Copy would be appreciated.

Objections to the Drawings

The Examiner has objected to FIGs. 2A-2C as failing to be clearly marked as Prior Art. Applicant has submitted revised drawings in which FIGs. 2A-2C have been amended as required by the Examiner.

Claim rejections, 35 U.S.C. § 102(e)

Claims 1 and 2 have been rejected under 35 U.S.C. § 102(e), as being unpatentable over the teaching of United States Patent Application No. 2003/0228081 (Tavlykaev). The Examiner's rejection is believed to be traversed by the above-noted claim amendments, and further in view of the following discussion.

United States Patent Application No. 2003/0228081 (Tavlykaev) teaches "an optical modulator including an optical waveguide, and at least one CPW-to-CPS transition. The CPW segments include a hot electrode; and a ground plane disposed on each side of the hot electrode, and they share a ground plane. The CPS segment extends along an interaction length of the modulator. In one embodiment, two driving signals are applied so that the modulator operates as a dual-drive modulator. In another embodiment, a domain-inverted region is formed in a substrate of the dual-drive modulator to overlap with one arm of the optical waveguide (MZI) and invert a sign of a phase shift induced in that arm. Finally, a fixed chirp can be introduced into the dual-drive modulator by asymmetrically positioning the interferometer arms into gaps of the CPW segments with respect to the hot electrode, and by employing unequal width gaps in the CPW segments". (Abstract)

Thus it will be seen that Tavlykaev teaches an optical modulator comprising a dual drive Mach-Zenhnder modulator, which can be driven by a pair of drive signals 511, 512. In various embodiments, the drive signals 511, 512 are equal in amplitude but opposite in polarity, or are equal in both amplitude and polarity. Tavlykaev also indicates that the drive signals 511, 512 may differ in both amplitude and polarity to produce an chirped output, but does not describe any embodiments utilizing such drive signals. Furthermore, Tavlykaev does not provide any teaching as to how the drive signals are generated. In fact, the sole description of drive signal generation provided by Tavlykaev appears at paragraph 50, thus:

> "Practical drivers for dual-drive modulators have dual electrical outputs that are either in-phase or out-of-phase. Modulators 500 and 600 can be used for in-phase and out-of-phase dual-drive modulators, respectively, thus providing extra flexibility in choosing an optimum modulator driver for a specific practical application."

In direct contrast, the present invention is directed to methods and systems for synthesizing an arbitrary complex optical E-field modulation using a dual-drive MZ modulator. As defined in amended claim 1, the present invention provides a step of deriving a pair of independent branch drive signals $V_L(t)$ and $V_R(t)$ based on sample values representative of a desired optical E-field.

Tavlykaev does not teach or suggest that the branch drive signals $V_L(t)$ and $V_R(t)$ are derived from sample values representative of a desired complex optical E-field. In fact, Tavlykaev does not teach or suggest any method of deriving the branch drive signals at all, but instead relies upon prior art drivers. As such, Tavlykaev cannot anticipate the method of amended claim 1.

In light of the foregoing, it is believed that the present invention as defined by amended claims 1 and 2 is clearly distinguishable over the teaching of United States Patent Application No. 2003/0228081 (Tavlykaev).

Claim rejections 35 U.S.C. § 103(a)

Claims 3-8 have been rejected under 35 U.S.C. § 103(a), as being unpatentable over the teaching of United States Patent Application No. 2003/0228081 (Tavlykaev) in view of United States Patent No. 6,693,929 (Essiambre et al.).

As noted above, Tavlykaev does not teach or suggest the elements of amended claim 1. United States Patent No. 6,693,929 (Essiambre et al.) fails to provide the missing teaching.

Essiambre et al. teaches an arrangement for generating chirped return to zero optical data signals. "Optical chirped return-to-zero (CRZ) data signals are generated without the need for a separate phase modulator, by using a dual-drive Mach-Zehnder modulator for RZ pulse carving that is driven with two typically sinusoidal signals of either unequal amplitude or unequal relative phase, i.e. of non-vanishing phase difference." (Abstract) Thus Essiambre et al. provides a pulse carver comprising a dual branch Mach-Zehnder modulator driven by a pair of sinusoidal drive signals. Essiamre does not teach or suggest that the drive signals are derived from any representation of a desired optical E-field, much less a stream of samples representative of the desired optical E-field, as in the present invention.

In light of the foregoing, it is respectfully submitted that the presently claimed invention is clearly distinguishable over the teaching of the cited references, taken alone or in any combination. Thus it is believed that the present application is in condition for allowance, and early action in that respect is courteously solicited.

If any extension of time under 37 C.F.R. § 1.136 is required to obtain entry of this response, such extension is hereby respectfully requested. If there are any fees due under 37 C.F.R. §§ 1.16 or 1.17 which are not enclosed herewith, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our Deposit Account No. 19-5113.

Respectfully submitted,
Douglas Lloyd McGhan et al

By: Kent Daniels, P.Eng.
Reg. No. 44206
Attorney for the Applicants

Date: July 30, 2004

Ogilvy Renault
Suite 1600
1981 McGill College Avenue
Montreal, Quebec
Canada, H3A 2Y3
(613) 780-8673